# LBNE Requests for the FNAL PDS

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# GENIE Requests

- Improved validation tools to limit turn-around time on official releases, and allow for multiple configurations - each with full sets of self-consistent uncertainties.
  - Cross section and nuclear models (NM) WG is working to add NMs and has a plan for an electron scattering experiment on an Ar target data at J-Lab
  - Want to be able to incorporate into GENIE and use in a timely manner
- Better documentation of the physics models
- Interfaces
  - Flux drivers
    - dk2nu ntuple format has been implemented for g4lbne beam simulations
    - Interface with NuMI/MINERνA hadronization reweighting
    - Atmospheric – inefficient, but known solutions which need to be implemented
  - Unified data input formats (including cross-generator coding/terminology standards)
  - Output formats
- A myriad of new models and reweighting tools (examples)
  - Kaon production models and related data constraints (proton decay backgrounds)
  - Hadronization model reweighting
  - Alternate NMs / FSI models
  - A consistent set of SF + np-nh + RPA + etc models

# GEANT4 Requests

- Keep up with the latest data
  - LArIAT
  - CAPTAIN
  - NA61
- De-excitation $\gamma$s
- Framework for tuning models to new data and generating related uncertainties
- Visualization tools
  - Beamline geometry
  - FD 3D event views
- Parallelization / multicore processing tools

# Comments

- Top Priority: Tools to allow us to incorporate new data and models, do validation and produce a self consistent set of uncertainties
- Also recommend: Documentation of physics models and input data, with clear procedures for including/excluding data sets and dealing with disagreement between data set

- Man Power:
  - We think this needs to be a collaborative effort between the experiments and the GEANT4/GENIE developers
  - LBNE is currently man power limited
  - Our current FTEs will allow for liaisons to help convey needs and test new software tools, but not contribute significantly to development
  - We will continue to identify new collaborators an suggest simulations related tasks and hope to contribute more to development as our collaboration builds and expands